

REMARKS/ARGUMENTS

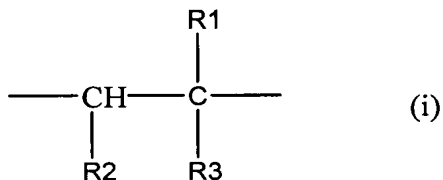
Favorable reconsideration is respectfully requested.

Claim 3 was amended to include the limitations of Claims 5 and 13. Claim 17 includes the limitations of Claims 3, 6 and 14.

The present invention as set forth in **Claim 3** relates to an **optical film exhibiting negative birefringence**, which comprises:

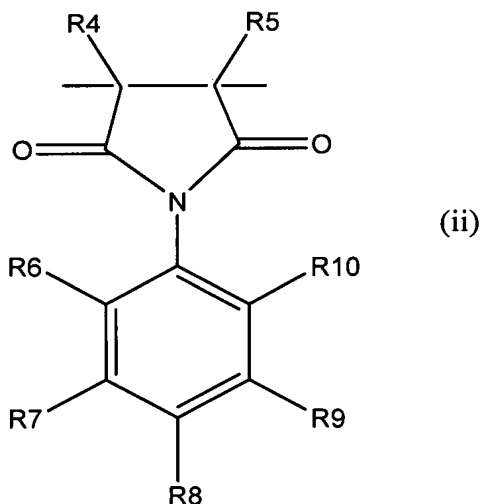
a resin composition, which comprises:

(a) 30-95% by weight of a copolymer comprising an α -olefin residual group unit represented by the following formula (i):



wherein R1, R2 and R3 each independently represent hydrogen or an alkyl group having 1-6 carbon atoms, and

an N-phenyl-substituted maleimide residual group unit represented by the following formula (ii):



wherein R4 and R5 each independently represent hydrogen, or a linear or branched alkyl group having 1-8 carbon atoms; and **R6, R7, R8, R9 and R10 each represent hydrogen**, and having a weight average molecular weight, as reduced into standard polystyrene, of 5×10^3 to 5×10^6 ; and

(b) 70-5% by weight of at least one acrylonitrile-styrene based copolymer selected from an acrylonitrile-styrene copolymer and an acrylonitrile-butadiene-styrene copolymer, a weight ratio of an acrylonitrile residual group unit to a styrene residual group unit being 20/80 to 35/65, and having a weight average molecular weight, as reduced into standard polystyrene, of 5×10^3 to 5×10^6 ;

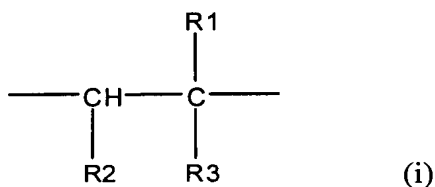
the optical film being obtained by uniaxially stretching the resin composition,
the optical film having a relationship of three-dimensional refractive indexes of $n_z \geq n_y > n_x$ or $n_y \geq n_z > n_x$ in the case where the stretching direction within a film plane is defined as an x-axis, a direction within a film plane perpendicular to the x-axis is defined as a y-axis, a direction outside the film, plane and perpendicular to the stretching direction is defined as a z-axis, a refractive index in the x-axis direction is

defined as n_x , a refractive index in the y-axis direction is defined as n_y , and a refractive index in the z-axis direction is defined as n_z .

New Claim 17 relates to an optical film exhibiting negative birefringence, which comprises:

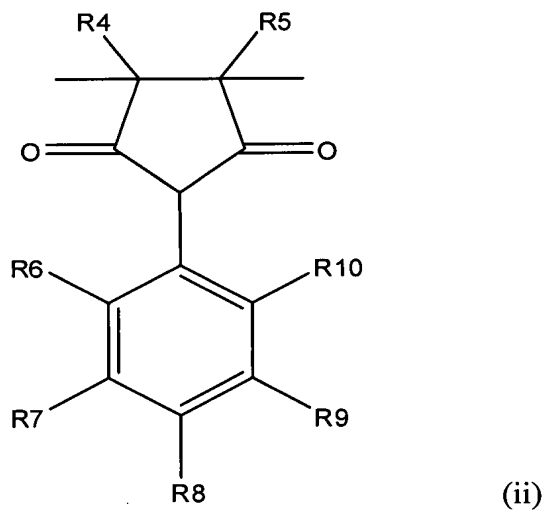
a resin composition, which comprises:

(a) 30-95% by weight of a copolymer comprising an α -olefin residual group unit represented by the following formula (i):



wherein R1, R2 and R3 each independently represent hydrogen or an alkyl group having 1-6 carbon atoms, and

an N-phenyl-substituted maleimide residual group unit represented by the following formula (ii):



wherein R4 and R5 each independently represent hydrogen, or a linear or branched alkyl group having 1-8 carbon atoms; and **R6, R7, R8, R9 and R10 each represent hydrogen, and**

having a weight average molecular weight, as reduced into standard polystyrene, of 5×10^3 to 5×10^6 ; and

(b) 70-5% by weight of at least one acrylonitrile-styrene based copolymer selected from an acrylonitrile-styrene copolymer and an acrylonitrile-butadiene-styrene copolymer, a weight ratio of an acrylonitrile residual group unit to a styrene residual group unit being 20/80 to 35/65, and having a weight average molecular weight, as reduced into standard polystyrene, of 5×10^3 to 5×10^6 ,

the optical film being obtained by biaxially stretching the resin composition,
the optical film having a relationship of three-dimensional refractive indexes of $n_z > n_y \geq n_x$ or $n_z > n_x \geq n_y$ in the case where the stretching direction is define as an x-axis and a y-axis within a film plane, a direction outside the film place and perpendicular to the x-axis and y-axis is defined as a z-axis, a refractive index in the x axis direction is defined as n_x , a refractive index in the y-axis direction is defined as n_y , and a refractive index in the z-axis direction is defined as n_z .

The claimed invention relates to an optical film, particularly suited for a retardation film, comprising (a) 30 to 95% by weight of a copolymer containing an α -olefin residual group unit represented by the formula (1) and an N-phenylmaleimide residual group unit represented by the formula (ii) and (b) 70 to 5% by weight of an acrylonitrile-styrene polymer, and satisfying the relation of three-dimensional refractive indexes of $n_z \geq n_y > n_x$ or $n_y \geq n_z > n_x$ (Claims 3, 4, 15, 16), or $n_z > n_y \geq n_x$ or $n_z > n_x \geq n_y$ (Claims 17-19).

The negative birefringence and the specified relation among the three-dimensional refractive indexes, both characterizing the optical film according to the present invention, are two-dimensional functions developed by the orientation of the polymer chains constituting the film, not the functions that the material inherently has.

The double patenting rejection of Claims 3-6 and 10-15 over claims 1-4 of US 7,001,967, in view of paragraphs [004 and 005] of the specification, and in further view of Arakawa et al is traversed.

The claims of US 7,001,967 fail to disclose or suggest the use of **a combination of components a) and b) in the amounts as claimed** or that such combination gives an optical film having negative birefringence or the claimed relation among the three-dimensional refractive indexes.

Arakawa et al disclose only the use of styrene/acrylonitrile copolymer and fail to disclose the use of component a). Arakawa et al disclose that a uniaxially stretched film of a styrene-acrylonitrile copolymer exhibits negative birefringence. It also discloses blending another polymer with a styrene-acrylonitrile copolymer. However, Arakawa et al neither discloses nor suggests blending an olefin-N-phenylmaleimide copolymer with a styrene-acrylonitrile copolymer.

In addition, the optical film having negative birefringence, and satisfying the relation among the three-dimensional refractive indexes of $n_z \geq n_y > n_x$ or $n_y \geq n_z > n_x$, or $n_z > n_y \geq n_x$ or $n_z > n_x \geq n_y$ according to the invention of the present application is neither described nor suggested at all.

The relation of the three-dimensional birefringence as set forth in column 5, lines 40 to 60 of Arakawa et al relates to **positive birefringence**, which is not describing a uniaxially stretched film comprising a styrene-acrylonitrile copolymer.

The Examiner is reminded that even if there was a prima facie case (which there is not as stated above), unexpected results can be used to rebut such prima facie case. Accordingly, optical films of the present invention having the claimed combination of components a) and b) in the claimed amounts do not exhibit fine cracks and can therefore be used as retardation films. See Examples 1-5 at pages 20 -25 of the specification.

In contrast, Comparative Examples 1-3 use **only component a)** (N-phenylmaleimide-isobutene copolymer and N-(2-methylphenyl)maleimide-isobutene copolymer, respectively in Comparative Examples 1 and 2) **or only component b)** (acrylonitrile-styrene copolymer in Comparative Example 3). **The resulting film have cracks and are brittle or have inferior heat resistance.** See pages 25-28 of the specification. Thus, any prima facie case has been rebutted.

Further, Applicants disagree with the Examiner's representation of what is disclosed in paragraphs [004 and 005] of the specification. Contrary to the Examiner's statements, these paragraphs relate to **background art** and describe the **drawbacks** of using PMMA and PS which have **insufficient heat resistance and are brittle** or of APO which exhibits **positive** birefringence. **There is no disclosure or suggestion of the combination of components a) and b) as claimed in the claimed amounts to produce an optical film having negative birefringence or the claimed relation among the three-dimensional refractive indexes.**

Thus, the double patenting rejection of Claims 3-6 and 10-15 over claims 1-4 of US 7,001,967, in view of paragraphs [004 and 005] of the specification, and in further view of Arakawa et al should be withdrawn.

The rejection of Claims 3-6 and 10-15 under 35 U.S.C. § 103(a) over JP 05-117334 and Arakawa et al is traversed.

JP 05-117334 and Arakawa et al fail to disclose or suggest an optical film exhibiting negative birefringence as claimed comprising components a) and b) in the claimed amounts and the claimed relation among the three-dimensional refractive indexes.

In addition, JP 05-117334 and Arakawa et al fail to disclose or suggest the superior properties obtained with the claimed film.

JP-117334 discloses an **olefin/ N-phenyl substituted maleimide/ N-alkyl substituted maleimide copolymer** and an optical material comprising the copolymer. The optical material exhibits **low** birefringence (JP-117334, abstract). However, **low** birefringence is **not negative** birefringence. Such optical materials cannot be used as optical films which positively make use of birefringence represented by a retardation film because of their characteristic low birefringence.

Further, JP-117334 describes that negative birefringence is controlled by the stereo structure of the benzene ring in the maleimide unit. This description refers only to the **N-phenyl substituted maleimide unit itself** or to N-phenyl substituted maleimide **homopolymer**. However, there is no disclosure or suggestion that a copolymer has negative birefringence.

Further, there is no disclosure of a method which results in a material having a negative birefringence. Thus, the material of JP-117334 does not exhibit a negative birefringence.

In paragraph [0022] in the fifth column and paragraph [0026] in the fifth to sixth columns both of page 4, some descriptions on blending are given, which, however, merely set forth blending of a material of positive birefringence with one of negative birefringence to **offset the birefringences** and prepare a low birefringent material, thus having an intention opposite to that of the invention of the present application whereby birefringence is definitively utilized.

Moreover, Example 2 discloses that an N-(2-methylphenyl)maleimide-isobutene copolymer has a photoelastic coefficient of -12×10^{12} (cm²/dyne). However, photoelastic coefficient represents the degree of ease with which birefringence is exhibited, and the value of -12×10^{12} (cm²/dyne) means low birefringence. Incidentally, Example 5 discloses that an N-phenylmaleimide-isobutene copolymer has a photoelastic coefficient of $+30 \times 10^{12}$ (cm²/dyne), evidently showing that an optical film does not always exhibit negative birefringence by using an olefin-N-phenyl-substituted maleimide copolymer.

Still further, JP 05-117334 does not disclose or suggest that the three-dimensional refractive indexes satisfy the relation of $n_z \geq n_y > n_x$ or $n_y \geq n_z > n_x$, or $n_z > n_y \geq n_x$ or $n_z > n_x \geq n_y$.

JP 05-117334 and Arakawa et al fail to disclose or suggest an optical film exhibiting negative birefringence as claimed comprising components a) and b) in the claimed amounts and the claimed relation among the three-dimensional refractive indexes.

However, the claimed films having the combination of components a) and b) in the claimed amounts do not exhibit fine cracks and can therefore be used as retardation films. See Examples 1-5 at pages 20 -25 of the specification.

In contrast, Comparative Examples 1-3 use **only component a)** (N-phenylmaleimide-isobutene copolymer and N-(2-methylphenyl)maleimide-isobutene copolymer, respectively in Comparative Examples 1 and 2) **or only component b)** (acrylonitrile-styrene copolymer in

Comparative Example 3). **The resulting film have cracks and are brittle or have inferior heat resistance.** See pages 25-28 of the specification. These superior properties are not disclosed or suggested by JP 05-117334 and Arakawa et al, alone or in **combination**. Thus, even a **combination** of JP 05-117334 and Arakawa et al does **not** render the present invention obvious.

Therefore, rejection of Claims 3-6 and 10-15 under 35 U.S.C. § 103(a) over JP 05-117334 and Arakawa et al are believed to be unsustainable as the present invention is neither anticipated nor obvious and withdrawal of this rejection is respectfully requested.

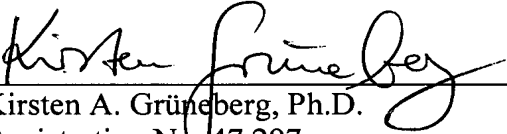
Applicants respectfully request that the Examiner acknowledge that all references cited in the **Information Disclosure Statement, filed in the above-identified application on March 18, 2004**, have been considered. Notably, the Examiner has not initialed references AW and AX. He states that the translations have not been submitted. **However, the IDS was filed with a Statement of Relevancy stating that the references are discussed at pages 1 and 2 of the specification. Thus, the references should be considered.**

Application No. 10/802,851
Reply to Office Action of March 2, 2007

Applicants submit that the present application is in condition for allowance. Early notice to this effect is earnestly solicited.

Respectfully submitted,

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